c. a fault detection circuit for detecting the presence of a ground fault condition in said pair of lines and for causing said relay circuit to open said circuit breaker when said fault condition detected exceeds a predetermined value, said fault detection circuit comprising an integrated circuit chip and a transformer; and

d. a single-sided circuit board having a first side and a second side, the second side having a pattern of conductive paths;

e. wherein said integrated circuit chip is mounted on the second side of said single-sided circuit board and wherein said relay circuit and said transformer are mounted on the first side.

REMARKS

The references cited by the Examiner along with the Examiner's comments have been diligently studied. Reconsideration of the application in light of this Amendment is respectfully requested.

Claim 1 has been amended. No claims have been added or cancelled. Therefore, claims 1-11 are under active consideration.

Applicant has invented a miniature appliance leakage current interrupter (ALCI) which interrupts the flow of current through a pair of lines extending between a source of power and a load. The ALCI comprises a circuit breaker having a pair of normally closed switches, one switch being located in each of the pair of lines between the source of power and the load. The circuit breaker is connected to a relay circuit which selectively opens the pair of normally closed switches. The relay circuit is connected to a fault detection circuit which detects the presence of a ground fault condition in the pair

of liens. When the ground fault condition detected exceeds a predetermined value, an integrated circuit chip in the fault detection circuit causes the relay circuit to pen the circuit breaker. The ALCI further includes a single-sided circuit board which is housed within a generally rectangular plug. The circuit board has a first side and a second side, the second side having a pattern of conductive paths. The circuit components of the ALCI are mounted on the circuit board with the integrated circuit of the fault detection circuit surface mounted on the second side.

The drawings have been amended to overcome the objections noted by the Examiner in paragraphs 1 and 2 of the Office Action. Withdrawal of the objection is respectfully requested.

Claims 1 and 11 stand rejected under 35 USC 102(e) as being anticipated by McDonald et al. (U.S. Patent No. 5,661,623). In support of the rejection the Examiner started McDonald et al. disclose an appliance leakage current interrupter (Figure 7) comprising a circuit breaker having a pair of switches (44,46 but not normally closed, a relay circuit (180), a fault detection circuit (212,52 and 54) comprising an integrated chip (212) and a transformer (52, 54) a single sided circuit board (Fig. 5,42) having pattern of conductive path and said integrated circuit chip is surface mounted on the second side of the circuit board (column 10, lines 28-31).

This rejection is respectfully urged.

McDonald et al discloses a ground fault circuit interrupter (GFCI) line cord plug which utilizes an electronically latched relay, rather than a circuit breaker or other type of mechanical latching device, to interrupt the AC load power when a ground fault

condition occurs. In order to reduce the size of the relay and minimize the cost and complexity of the GFCI plug, the fixed and movable relay contact structures are mounted directly to the circuit board which carries the remaining components of the GFCI circuit. In a preferred embodiment, the fixed relay contact structures are integral with the plug blades of the GFCI plug. The movable relay contact structures preferably comprise deflectable spring arms which are preloaded when the relay contacts are in the open position in order to control the contact gap, and which are deflected past the point of contact closure when the relay contacts are in the closed position in order to increase the closing force. The principal electrical components of the GFCI plug, including the relay contacts, relay coil and sensing transformer, are mounted on the circuit board in a generally tandem or in-line arrangement in order to minimize the dimensions of the plug.

Regarding the 35 USC 102(e) rejection, McDonald discloses an ALCI having a pair of switches; however the switches are normally open and not normally closed, as called for in claims 1 and 11. Secondly, it is not seen where column 10, lines 28-31 in McDonald teaches, discloses or suggests mounting an IC chip on the second side of a single sided circuit board and the relay coil and transformer on the first side of the circuit board. At most, all McDonald states in column 10, lines 28-31 is that resistors, capacitors and integrated circuits can be mounted on either side of the circuit board. No mention is made as to what specific components should be mounted where, or the advantages thereof. Specifically, no teaching, disclosure or suggestion is made to have

the IC chip on the second side and the relay coil and transformer on the first side so that the overall size of the device can be made smaller.

Withdrawal of the rejection of claims 1 and 11 under 35 USC 102(e) is respectfully urged.

Claims 2-10 stand rejected under 35 USC 103(a) as being unpatentable over McDonald et al.

In support of the rejection, the Examiner stated, "a. regarding claim 2, McDonald et al. further disclose said transformer including a common core (220,222), a primary winding, and a secondary winding (224,226). However, McDonald et al. does not specifically disclose the transformer having three laminated layers and the primary winding being wrapped twice around the core of the transformer. It would have been obvious to one having ordinary skill in the art to modify the primary winding of the transformer to minimize the dimensions of the appliance leakage current interrupter (abstract, last 2 lines) which is not a matter of ordinary invention (see in re yount, 80 USPQ 141).

b. Regarding claims 3 and 4, McDonald et al. further disclose the appliance leakage current interrupter (Figures 1-5) comprising generally rectangular-shaped housing (10) being mounted on an end of an electrical cord (40); a prong assembly (Figure 2) comprising a pair of contact prongs (22,24) which extend through said housing and a pair of conductive bracket arms (Figure 5, 44 and 46)).

c. Regarding claims 5, McDonald et al. does not specifically disclose the pair of prongs extend out from said housing at an angle of 180 degrees. It would have ben

obvious to one having ordinary skill in the art to modify the prongs to extend at an angle of 180 degrees to provide an appliance leakage current interrupter which is relatively small and compact, allowing it to be incorporated into an AC line cord plug (column 2, lines 46-49).

d. Regarding claims 6, McDonald et al. further disclose the pair of prongs extended out from said housing an angle of 90 degrees from the longitudinal axis of the cord (Figure 2).

e. Regarding claims 7-10, McDonald et al. further disclose (Figure 7) a power supply circuit (214,202) for providing alternating current to the integrated circuit chip comprising a metal oxide varistor (202), a test circuit (34, 258); and said relay circuit comprises a solenoid (180) and a rectifier (236), and a resetting assembly (36) for resetting said appliance leakage current interrupter after detection of a ground fault. This is further demonstrated by applicant disclosure on Figure 2."

This rejection is respectfully traversed.

Applicant disagrees with the Examiner's comments regarding claim 2. Nowhere in McDonald is there any teaching, disclosure or suggestion that the size of the transformer can be made smaller by using 3 laminated rings instead of 5 and then wrapping the wires around twice instead of once to build up the primary. In the absence of a teaching for these changes it is submitted that it is clearly not obvious to do so. Instead, the only basis for doing this is applicant's own disclosure. Allowance of these claims is respectfully urged.

Claims 3 and 4 are deemed allowable for the reasons noted above regarding claim 2, on which claims depend.

Applicant disagrees with the Examiner's comments regarding claim 5. There is absolutely no teaching, disclosure or suggestion in McDonald to have the prongs extend out from the housing at an angle of 180 degrees nor any teaching, disclosure or suggestion in McDonald as to how this could be achieved. All McDonald states in column 3, lines 46-49 is that it is an object of the invention to provide a GFCI device that is small and compact. McDonald makes no mention concerning having the prongs extend out at 180 degrees. The only basis for his is applicant's own disclosure. Withdrawal of the rejection is respectfully urged.

Claim 6 is considered allowable because of its dependency on claim 2.

Applicant disagrees with the Examiner's comments concerning claim 9 (i.e. sub paragraph 3 in paragraph 5). The solenoid in McDonald closes rather than opens the pair of switches.

The rejection of claims 1 and 11 under 35 USC 103(a) as unpatentable over Baer in view of Werther is respectfully traversed. As Stated by the Examiner, "Baer et al. disclose an appliance leakage current interrupter (Figure 1) comprising a circuit breaker having a pair of switches (SWI and SW2), a relay circuit (14), a fault detection circuit (16) comprising an integrated chip (26) and a transformer (28, 42). Baer et al. does not specifically a single sided circuit board having pattern of conductive path and said integrated circuit chip is surface mounted on the second side. Werther discloses a multi-level electrical assembly (Figure 1) for coupling additional circuit elements to a set of

conductive pathways to increase the circuit board density. It would have been obvious to one having ordinary skill in the art utilize the technology taught by Werther to modify the appliance leakage current interrupter taught by Baer et al. to product an appliance leakage current interrupter having a single sided circuit board having pattern of conductive path and said integrated circuit chip is surface mounted on the second side in order to increase the board density and produce a relatively small and compact appliance leakage current interrupter (Baer et al. column 1, lines 57-59)."

The defects present in Baer; i.e. normally open rather than normally closed switches, and an IC mounted on the second side rather than the first side are in no way cured by the addition of Werther for the specific reasons noted by the Examiner. Withdrawal of the rejection is respectfully urged. The technology taught by Werther certainly would not teach, disclose or suggest having the IC chip in Baer on the second side of a circuit board and the other components on the first side of the circuit board. In fact, Baer does not mention anything about the circuit board holding the components, let alone which component is on what side.

Allowance of the application with claims 1-11 is earnestly solicited.

Respectfully submitted,

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August 10, 1998

Approved
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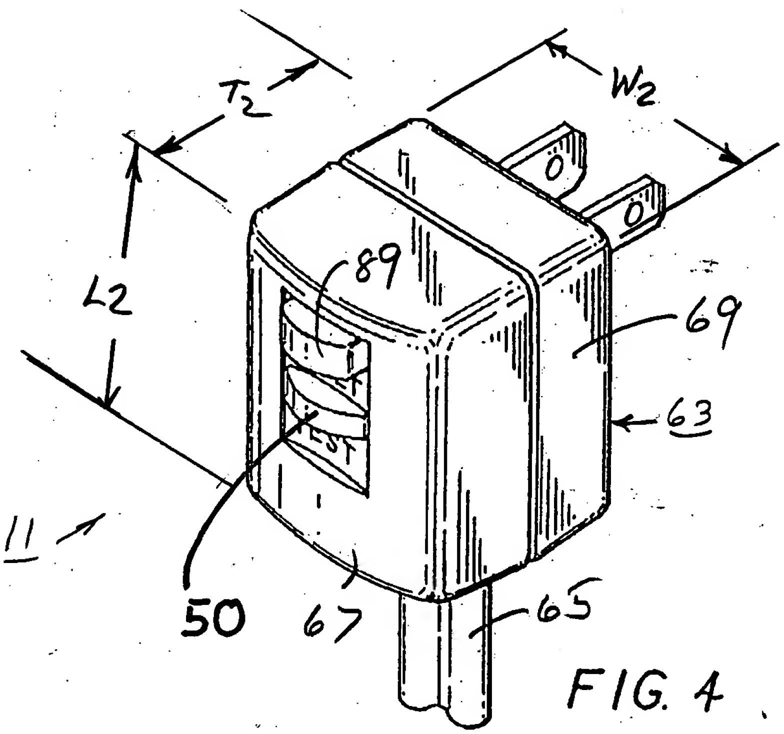

FIG. 4

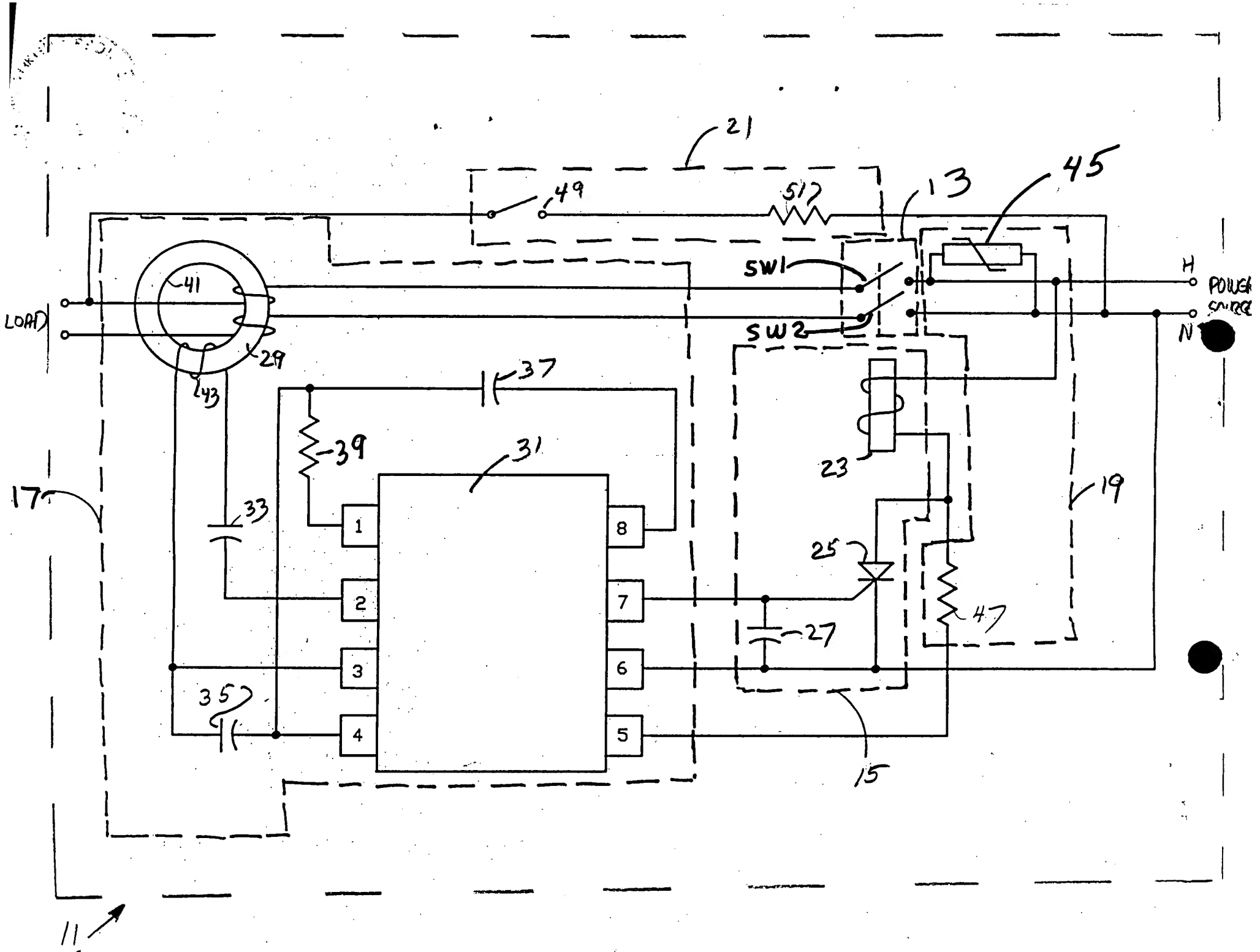
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FIG 5

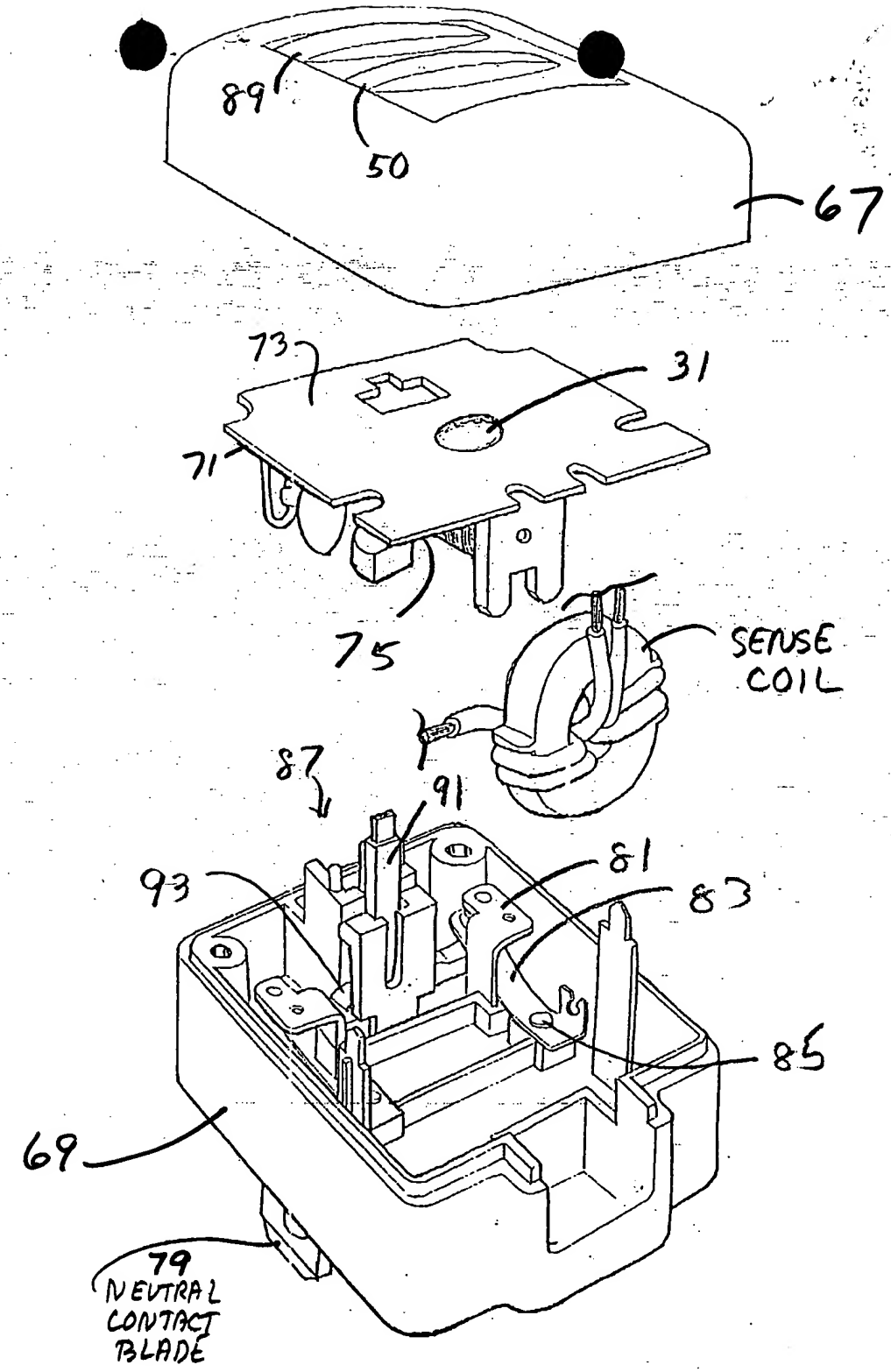
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FIG. 6